[0046] Flip-Style User Interface

[0047] **FIG. 4A** illustrates a flip interface **500** coupled to a computer system **100** in accordance with one embodiment of the present invention. Computer system **100** can be a portable computer system such as a palmtop or PDA. However, it is appreciated that flip interface **500** can also be coupled to other hand-held devices, such as cell phones, pagers, game systems and the like. Furthermore, flip interface **500** can be coupled to computer system **100** in many different locations. That is, for example, **FIG. 4A** illustrates a flip interface **500** coupled to any edge or surface of computer system **100**. As will be seen, flip interface **500** can also be coupled to a device other than computer system **100**.

[0048] In the present embodiment, flip interface **500** comprises one or more flexible layers (or leaves) constructed of any suitably flexible material. For simplicity of illustration, two adjacent leaves **540** and **550** are shown; however, it is appreciated that any number of leaves can be used in accordance with the present invention.

[0049] In one embodiment, a pad **510** is positioned on the upper surface of leaf **540**. On the lower surface of leaf **540**, facing leaf **550**, is a pad **520**. On the upper surface of leaf **550**, facing leaf **540**, is a pad **530**. A pad on the lower surface of leaf **550** is not shown. Other leaves (not shown) in flip interface **500** also have pads on their upper and lower surfaces.

[0050] In the present embodiment, pads **510**, **520** and **530** are electrical contacts or switches that are coupled to a bus **110** of computer system **100** (refer also to **FIG. 6**, below). Pads **520** and **530** are positioned on leaves **540** and **550**, respectively, such that they are in electrical contact with each other when leaves **540** and **550** are in a relaxed (not bent) position or when leaves **540** and **550** are not separated.

[0051] Continuing with reference to **FIG. 4A, a** user can separate or bend leaves **540** and **550**, for example, by rubbing a finger along their edges or by flipping the leaves. Thus, a user can utilize flip interface **500** using a single hand, providing a convenient user interface.

[0052] When leaves **540** and **550** are separated or bent, pads **520** and **530** will separate (or move relative to one another). Separation of leaves **540** and **550** will break the electrical connection between pads **520** and **530**, which is detected by computer system **100** via bus **110**. Relative movement of pads **520** and **530** can be similarly detected.

[0053] The separation or bending of leaves **540** and **550** can also be directly or indirectly detected using a mechanism such as a strain gauge, accelerometer, optical sensor, or a similar instrument (not shown) integrated into the leaves or coupled with the leaves. For example, a strain gauge or optical sensor can be used to directly detect an amount of bend of leaf **540** or leaf **550**. An accelerometer can be used to indirectly detect an amount of bend of leaf **540** or leaf **550** by sensing the momentum imparted to the leaf when it returns to its relaxed (straight) position (e.g., when the user's finger is removed).

[0054] Movement (separation or bending) of one or more of leaves in flip interface **500** is used to control some aspect of the display device (not shown) for computer system **100**, or to control some aspect of the image displayed on the display device. Flip interface **500** can be used in various ways to provide the same functionality as conventional user interfaces. Flip interface **500** can be used to select and implement various functions, commands and applications in response to a user's input.

[0055] Flip interface **500** can also be used to move from one application to another, or to move within an application. For example, flip interface **500** can be used to select and display an address book application, and then to select and display a word processing application. Within the address book application, flip interface **500** can be used to move from one entry to another. Within the word processing application, flip interface **500** can be used to select and display a particular document, to select and implement the different commands used by the word processing application, and to select which page of the document is to be displayed.

[0056] Flip interface **500** can also be used to scroll from hyperlink to hyperlink in a displayed Web page. In addition, flip interface **500** can be used to control movement of an object within a gaming environment. It is appreciated that the uses of flip interface **500** as described above are exemplary only, and that there are other uses for flip interface **500** in computer system **100**.

[0057] In various embodiments, the rate at which leaves **540** and **550** are moved, the order in which they are moved (e.g., front to back, or vice versa), and the amount of deflection imparted to the leaves can be monitored and used to control various aspects of the display. For example, the number of pages skipped between pages displayed in an electronic document, or how quickly the displayed image is changed, can be based on how quickly the user moves leaves **540** and **550** in flip interface **500**.

[0058] In one embodiment, the amount of time that leaves **540** and **550** are separated can also be used to control some aspect of the display device or the displayed image. For example, the user can rapidly flip leaves **540** and **550** of flip interface **500** to move deeper into a multi-page electronic document; when the user pauses for a predetermined amount of time, the multi-page document would be opened to display the page at the position corresponding to where the user stopped flipping.

[0059] In another embodiment, a leaf (e.g., leaf **540**) can be labeled or indexed so that when a user touches that leaf (that is, separates it from another leaf or bends it), an associated function is automatically performed. For example, leaf **540** can be associated with a certain page in an address book (e.g., an index) and labeled as such. When the user touches leaf **540**, the associated page in the address book is displayed.

[0060] Thus, the present embodiment of the present invention flip interface **500** provides a convenient and user-friendly device for controlling aspects of a display device and/or aspects of a displayed image. Flip interface **500** takes advantage of the portability of hand-held devices (such as computer system **100**) by enhancing the capability to control and manipulate such a device using a single hand. Flip interface **500** can be used with different types of display devices using conventional display technologies, or newer technologies such as electronic paper and electronic ink.

[0061] **FIG. 4B** is a side perspective view of flip interface **500** comprising leaves **540**, **550** and **560**. Leaves **540**, **550**